

AUGUST 29, 1921

Issued Weekly

PRICE 15 CENTS

AVIATION AND AIRCRAFT JOURNAL



British Rigid Dirigible R-80

VOLUME XI
Number 9

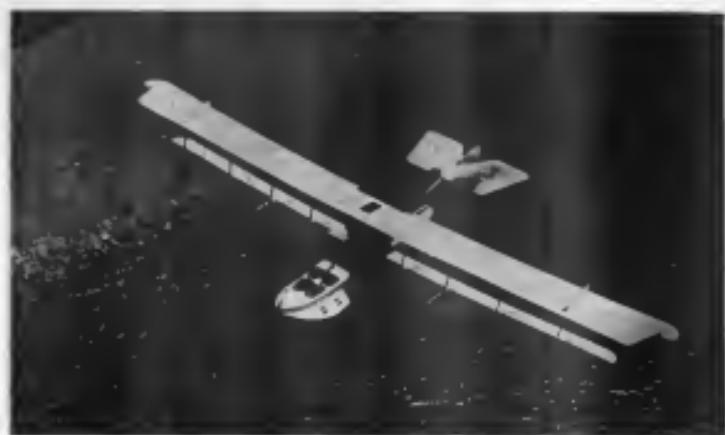
SPECIAL FEATURES

LOENING MODEL 23 FLYING BOAT
"WHO'S WHO IN AMERICAN AERONAUTICS"
FLIGHT THROUGH THE GRAND CANYON
NAVAL BUREAU OF AERONAUTICS

Four
Dollars
a Year

RECEIVED
SEP 2 1921
FIELD OFFICERS' SCHOOL
LANGSTON FIELD, VA.
PROPERTY OF

THE GARDNER, MOFFAT CO., INC.
HIGHLAND, N. Y.
225 FOURTH AVENUE, NEW YORK



Aeromarine—Navy Sixty-Cockpit HS2-L in operation over the Hudson River

The sale by us of navy coast patrol HS2-L flying boats affords an unusual opportunity to establish commercial flying companies at about one-third the investment ordinarily required.

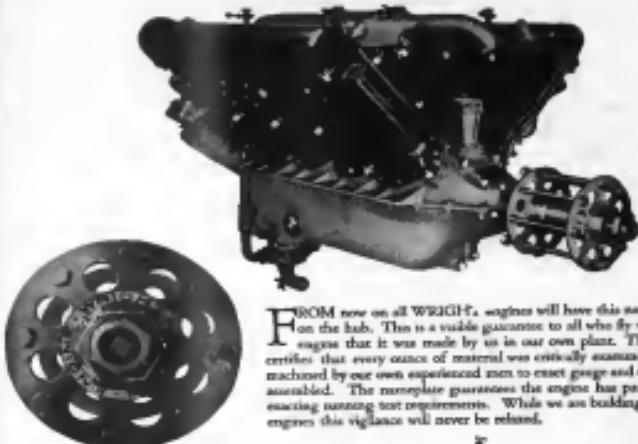
Write for catalogue and our dealers' proposition.

Aeromarine-Navy 5 and 11-passenger flying boats are maintaining successful air transportation over the waters adjacent to New York, in the south between Key West and Havana and on the Great Lakes. In the hands of operating companies they are demonstrating daily the safety and profit of flying boat transportation.

**AEROMARINE
ENGINEERING & SALES CO.**
TIMES BUILDING



NEW YORK



The identification of
Incomparable Service

MINIMIZING REPAIRS

The new models of WRIGHT engines have thicker cylinder sleeve bands and increased cooling around the valves. This has stopped valve warping. From 200 to 300 hours may be expected without regreasing valves. A new device makes engine greasing an easy operation.



FROM now on all WRIGHT engines will have this masterpiece on the hub. This is a visible guarantee to all who fly with the engines that it was made by us in our own plant. This plate certifies that every ounce of material was critically examined, then machined by our own experienced men to exact gauge and carefully assembled. The microscope guarantees the engine has passed our exacting mounting test requirements. While we are building strength engines this vigilance will never be relaxed.

The seven absolute requirements for aircraft engines are fulfilled in the new models of Wright engines now in production and being sold.

ENGINES IN OPERATION

RESULTS IN PLANE OPERATION

- 1. Engines per horsepower: Greater useful load, increased performance.
- 2. High power: Speed, climb, power reserve.
- 3. Low fuel consumption: Economy, long travel radius, increased useful load.
- 4. Short overall length: Increased maneuverability, compact installation.
- 5. Interchangeable parts: No long repair periods, economy, safety.
- 6. Longevity: Many WRIGHT engines built four years ago are still flying. Many have flown 10,000 hours and more. Many have 15,000 hours.
- 7. Reliability: Many thousands of our powerplants, we believe commercial flyers to figure on ultimate life of 4,000 hours.

The reliable WRIGHT engines safeguard stability of the flyers. Their soaring quality and low requirements, small, inexpensive, compact, reliable engines make these engines the most reliable in the world.

Compare the characteristics of these stock engines now in production with any engine built—foreign or domestic.

WRIGHT B-6

Power at 2,000 R.P.M.	110 H.P.
" " 2,500 "	125 H.P.
Weight, dry with hub	214 lbs.
Gas per 15.0 hours	14 lbs.
Overall length, including hub and prop.	6' 11 1/2"

NOTE.—The power figure is the same total power, many individual engines give higher power and lower compression.

WRIGHT AERONAUTICAL CORPORATION
PATERSON, N. J.

W R I G H T
AERONAUTICAL ENGINES
STANDARD MOTIVE POWER FOR ALL AIRCRAFT



**DISTRIBUTORS OF THE PRODUCTS
OF THE
CURTISS AEROPLANE & MOTOR CORPORATION:**

THE STATE OF ILLINOIS,
Waukegan Office of the parent corp.

THE STATE OF MICHIGAN, EXCLUDING THE UPPER
PENINSULA

MOST OF THE STATE OF OHIO

THE STATE OF IOWA

MOST OF THE STATE OF MISSOURI

THE STATE OF INDIANA

MOST OF ALABAMA AND GEORGIA

THE STATES OF OREGON, WASHINGTON & IDAHO

THE STATES OF VIRGINIA & NORTH CAROLINA

THE STATES OF NEVADA AND NORTHERN CALIFORNIA

THE STATE OF NEBRASKA

THE STATE OF WISCONSIN AND UPPER PENINSULA
OF MICHIGAN

THE STATES OF NEW MEXICO, UTAH, WYOMING, AND
COLORADO

THE STATES OF PENNSYLVANIA, MARYLAND, DELAWARE
& SOUTHERN NEW JERSEY

THE STATES OF MINNESOTA, IOWA, SOUTHERN
Dakota, and North Dakota

THE STATE OF KANSAS AND PART OF MISSOURI

THE NEW ENGLAND STATES

THE STATES OF TEXAS, OKLAHOMA, AND UNINCORPORATED
TERRITORIES

ALL COUNTRIES OF SOUTH AMERICA

THE STATES OF MASSACHUSETTS AND RHODE ISLAND

PARTS OF THE CAROLINAS

Curtiss Aeroplane & Motor Corporation,
20 North Michigan Ave., Chicago, Ill.
Thompson Aeroplane Company,
1015 Woodward Ave., Detroit, Mich.
Floyd J. Logue,
120 Superior Ave., N. W., Cleveland, Ohio.
Curtiss Aeroplane Corporation,
Fort Dodge, Iowa.
St. Louis-Curtiss Aeroplane Company,
4901 Florissant Ave., St. Louis, Missouri.
Curtiss Indiana Company,
Kokomo, Indiana.
Curtiss Road Aeroplane Company,
Montgomery, Alabama.
Dreyers, Workhorses & Macks Company,
1000 Third St., Portland, Ore.
Lansing Aeroplane Co.,
101 Wall St., Lansing, Michigan.
Ed F. Cooper Aeroplane & Motor Corporation,
Kerr & George Sts., San Francisco, Calif.
Great Island Aeroplane Company,
Great Island, Wiscasset.
Curtiss Wisconsin Aeroplane Company,
100 Clinton St., Milwaukee, Wisc.
Curtiss Hampshire Aeroplane Company,
104 Main St., Worcester, Mass.
Curtiss Eastern Aeroplane Company,
104 S. 12th St., Philadelphia, Penna.
Curtiss Northwest Aeroplane Company,
104 Minneapolis, North 8th St., Minneapolis, Minn.
William S. Hill Aeroplane Company,
Arlington, Calif., San Jose.
Curtiss New England Aeroplane Company,
Gardiner City, Long Island, N. Y.
Curtiss Aircraft Corporation,
Gardiner City, Long Island, N. Y.
Love Field, Dallas, Texas.
C. W. Webster,
Curtiss Aeroplane & Motor Corporation,
Gardiner City, Long Island, N. Y.

DEALERS

Lineney Aeroplane Transportation Company,
7 Central Square, Lynn, Mass.
E. L. Marston Company,
228 E. Town St., Charlotte, N. C.

L. D. CARRIER, PRESIDENT
W. D. MURRAY, VICE-PRESIDENT
W. J. SCHAFFER, TREASURER
GEORGE NEWHORN, SECRETARY-TREASURER
GENERAL MANAGER
SALVATION ARMY

Vol. XI

AUGUST 29, 1921

**AVIATION
AND
AIRCRAFT JOURNAL**

LAWRENCE O'DONNELL, EDITOR
ALEXANDER KLEIN, ASSISTANT EDITOR
EDWARD P. WARREN
RALPH H. UPTON, ASSISTANT EDITOR

No. 9

Safety in Aviation

ANYTHING that is practical can always be made safe by proper management and regulation. Aviation is no exception to this, but just as the careful automobile driver is safeguarded by the mistakes of others, so an aviator whose mistakes are disastrous is handicapped without a uniform and intelligent regulation of all air traffic.

Nearly every material has at some time or other felt the inconveniences and fatality of special local laws governing the use of automobiles, even though fully 99 per cent of all automobile traffic is local in character. Considering that the great bulk of commercial aviation must be far out-of-town travel, standardized local regulations for aircraft are every bit as logical as that to help. The need for some measure of universal control, therefore, suggests and puts a big responsibility on the recently appointed "Aviation Safety Code Committee" sponsored by the U. S. Bureau of Standards and the Society of Automotive Engineers.

Although detailed legislation would be necessary as the result of study and care, it seems not too soon to express some of the general ideas that such regulation should fulfill.

Standards should be provided by which to judge the structural safety and smoothness of a machine and, at the same time, not unduly retard research work and the development of experimental types of machines.

Security in air transport should be restricted sufficiently to guarantee safety but not so much as to hinder its development and expansion.

Cooperation with existing laws of other nations should be made as close as possible.

In everything that is done it should be realized that aviation is still in a stage of rapid development and consequently the greatest factor in its success will be the character and ability of the men actively associated with it.

The Disappearance of the Aeronautical Engineer

ABOUT three years ago, there had been a unanimous resolution in this country that the fundamental problem in the design and production of airplanes at that of technical education and that, in any country, an aeronautical industry in war or in peace can grow up only around a well-trained, up-to-date, and enthusiastic aeronautical engineering profession. On the heels of that resolution followed attempts to increase the corps of aeronautical engineers in the United States by special schools for their training and by encouraging all those who had any bent for aeronautics to take up such studies.

Today, however, the aeronautical engineering profession has gone far off, as far as superficial indications go, to a few men connected with airplane companies and a very few others engaged in consulting work or in teaching. Of the more and hundreds of men trained during the war in our

many more planes of the air, nearly all have drifted away and there appears to exist no means of keeping in touch with them or of calling into national service again with a maximum of efficiency and minimum of delay should the need arise. To take a single concrete illustration, about 80 Army and Navy officers were graduated, on the completion of a thorough intensive course in aeronautical engineering principles, from a series of schools run at the Massachusetts Institute of Technology during the war. Of these passed on but a score now remain in the governmental service or in any connection with aeronautics. While it is not to be expected that the industry under peace conditions can support as large a body of engineers as in times of national emergency, it is at least essential that men with such training should be registered and kept on record for special service as far as possible, and that they should be encouraged to keep up their aeronautical studies in some degree and to keep in touch with modern developments. Such papers on current development as have been presented by Major Bass and others to the Society of Aeronautical Engineers and the American Society of Mechanical Engineers are an excellent step in this direction and an effort should be spared to see that all such material is kept before those whose war-time training will enable them at least to read it profitably and understandingly.

Another Original American Design

IF any further proof were needed of the assertion that American aircraft designers, given a fighting chance—which many now seem confirming government orders—produce machines second to none both abroad and often a notch better, the new Loening seaplane may be taken as an example.

Here is a flying boat of original American design whose performance equals if it does not exceed that of many a European land machine of the same carrying capacity. This is an achievement which should make Americans appreciate the position our engineers are holding in aeronautics.

International Seaplane Records

IN connection with the ultimate record which was established by the Loening Model 23 flying boat it will surprise most of our readers to learn that the International Aeronautical Federation does not recognize records made by seaplanes as distinct from land machines. The reason for this attitude is not very clear. Seaplanes, particularly flying boats, differ from land machines very considerably in structure as well as in performance, so that it seems rather unfair to include them in the general class of seaplanes.

We understand that the delegates of the Aero Club of America intend to bring up this point at the next annual convention of the F.A.I.

The Loening Model 23 Flying Yacht

Reaches 19,500 Ft. Altitude with Four on Board

The latest product of the American aircraft industry, the Loening Model 23 flying yacht, made its first public appearance on August 16, at Port Washington, Long Island, when it reached an altitude of 19,500 ft., setting a new world record for sustained altitude, and the first time the machine was piloted by Edward McCallum, formerly Commander, U.S.N., and pilot of the NC-3 during the famous transatlantic flight, and carried as passengers Grever C. Loening, designer of the new flying boat, L. R. Grassman and Ladislao Gómez, editor of *AVIATION AND AIRCRAFT JOURNAL*. The latter acted as flying observer for the Contest Committee of the Aero Club of America, while Caldecott S. Young, chairman of the committee, and Theodore Cheary, governing director of the club, acted as ground observers. The aeronauts which were carried during the flight will be officially invited by the

two-meter dive in the manner generally associated with flying boats. Within the next thousand feet the temperature dropped, and from then on until the point of the dive was reached the temperature gradually fell to 40° F. At 14,000 ft. the rate of the temperature drop was still greater, and the pilot was quite apprehensive of the fact that the temperature had dropped quite appreciably and wondered how much higher the pilot would go. The ugly name in the form of a look the pilot darted toward Mr. Grassman, who thereupon extricated from his pocket a strip of rubber and placed it against the radiator, where it was held fast by the ice pressure. As the radiator was not fitted with a shelter arrangement, it was necessary to use this emergency method to prevent the engine from being chilled. The accessibility of the engine in flight was that well demonstrated and to the pilot's intention to continue his climb. The details of the



FRONT VIEW OF THE LOENING MODEL 23 FLYING YACHT, MADE POSSIBLE BY THE INGENUITY OF THE DESIGNER, GAVE IT THE APPEARANCE OF A MAMMOTH BOAT.

Board of Standards for certification of the record with the International Aeroplane Federation. As the previous record for this class of machines stood at 9,000 ft., there can be no doubt that it has been very largely exceeded by the performance of the Loening Model 23.

Among those who witnessed the test were Representative Fredrick C. Hoxie, of Port Washington; Albert D. Loening, Charles L. Lawrence, Lt. Comdr. J. A. Davis, U.S.N., of the Bureau of Aeronautical Engineering; Commander Lehman, U.S.N., in charge of the U.S.S. Langley, the new aircraft carrier; Commander Leighton, U.S.N., Augustus Post, secretary of the Aero Club of America; James B. Taylor, George Newbold and Clark Younger.

Portions of the Flight

The weather was ideal for the test, the sky being clear up to high altitudes, with a light breeze blowing. At 10,000 ft. the flying yacht was let down the slip from the hangar in which it was sheltered and the surprised crew went to board. After the usual aerographs had been put on board, Pilot McCallum last started the Liberty engine with a self starter—while working— and soon the propeller was under way, driving into the wind. It was noticeable that the machine was not steady, there being some lateral movement, and after that the aircraft effectively protected the crew against the spray created on reaching speed. The take-off occurred after a short run, and after circling once over the bay, Pilot McCallum started climbing at wide curves. As the earth receded more and more, the details of the various islands and reefs of the Sound stood out with remarkable清楚ness, their contours appearing like on a topographical map.

At 8,000 ft. the air became somewhat bumpy and it was gratifying to note how promptly the machine answered the controls, for it reacted much more like a high performance

ground-borne motorboat and seaplane, the temperature colder, and more rubber strips were put against the radiator. The three passengers, who were much less warmly clad than the pilot, gradually descended to sit it out—for there were no passengers on board. They were by the way fortissimo in having the propeller at their back and in the single cockpit in which they were sitting, the experience might have been much more uncomfortable.

Messing Aérodrome

Finally when the needle of the barograph registered an altitude of over 10,000 ft., Pilot McCallum turned toward the half frozen ocean and with a charming smile nodded his head as if to say, "Well, that's that!" And being apparently satisfied with the altitude reached he pushed the nose of the machine down. Although the cold air at the high altitude reached did not tempt the crew to engage in much group gazing, their main object of interest being the altitude registered by the barograph, such glimpses as were taken demonstrated an extremely clear atmosphere, in which the land details stood out with great sharpness. The peak of the island was about 10,000 ft.

The descent was made at a rather rapid rate, for a few minutes later Pilot McCallum came in over the Port Washington harbor and gave those assembled to watch the site as sites of the behavior of the machine by diving within a few feet of the water and then pulling up sharply and putting her into a healthy climb. After a few more circles over the bay the Loening machine alighted on the water in a remarkably smooth fashion, so buoyant being noticeable from the cockpit, and ran to her mooring buoy, where she was met by the crew. The substantial deck running from the bow to either side of the cockpit made this a simple maneuver.

August 26, 1923

AVIATION

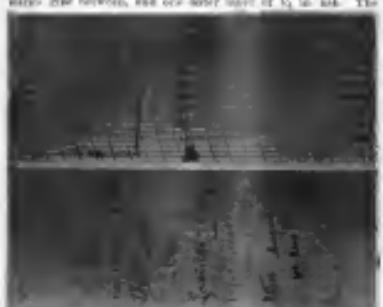
Description of the Loening Model 23 Flying Yacht

As may be seen from the associated cutline drawings and illustrations, the Loening Model 23 Flying Yacht is a seaplane-pusher flying boat. It is of the long hull type, as distinct from the short hull or bat boat type represented by the NC and the Vought VE-3N seaplanes, but it differs from the latter boats above in the fact that the temperature had dropped quite appreciably and wondered how much higher the pilot would go. The ugly name in the form of a look the pilot darted toward Mr. Grassman, who thereupon extricated from his pocket a strip of rubber and placed it against the radiator, where it was held fast by the ice pressure. As the radiator was not fitted with a shelter arrangement, it was necessary to use this emergency method to prevent the engine from being chilled. The accessibility of the engine in flight was that well demonstrated and to the pilot's intention to continue his climb. The details of the

airframe pressure that would prevail inside and outside of the hull at high altitudes.

The wings are the standard struts adopted by the Loening Aeroplane Engineering Corp. for their new Model 23 flying boat, which are supported by two main struts which are braced with diagonal struts against side canting. The weight of the wing struts complete is 290 lb.

The engine, a 450 hp Liberty fitted with a 4-bladed Hart self propeller, runs at two revs. per second which are supported on two M. struts held integral with the portons. The space



THE BAROGRAPH RECORD OF THE 19,500 FT. ALTITUDE FLIGHT

and thickness of the bottom throughout its length is $\frac{1}{4}$ in. The side and top are of $\frac{3}{4}$ in. mahogany veneer. The framework is of spruce and the portons are generally braced by a triple truss with cross wires which in itself will take the load without the assistance of the planking. The portons have a $\frac{1}{2}$ in. \times $\frac{1}{2}$ in. \times $\frac{1}{2}$ in. bottom throughout its entire length, including the tail section, and is fitted with a single step. All the planking is held together to do away with the risk of severs or splitting out under the strain.

At very low altitudes the bottom deck drawings, in plan view, the portons have the same width from aft of the engine to the tail, an arrangement which was adopted with the particular view to economizing porpoising and which the tests have proved to be justified.

The cockpit is subdivided into upper main-tight compartments, each being provided with its individual hand hole and venturing tubes. Incidentally, for the altitude flight a 1,500 cu. in. bulb was made in each hand hole to prevent the passenger sitting without his. On the nose of the fuselage a small staff carries a metal pressure which answers the



EDWARD McCALLUM, WHO PILOTED THE LOENING MODEL 23 FLYING YACHT ON ITS RECORD BREAKING FLIGHT.

available between the arms of the M struts is made use of for housing the gasoline and oil tanks, which are under pressure. The wide struts are carefully streamlined, the curving leading into the rear portion of the cockpit.

The cockpit has accommodations for five persons, including the pilot, sitting forward on individual seats, while the other four are seated in a row behind the pilot. The front seat is a general air of movement about the cockpit which should strongly appeal to the newer pilot or to the amateur aviator flying with a private pilot. Access is had through a side door which opens onto a running board making a circle around the nose of the machine, a provision which makes it easy to take on and get off passengers without fear of the latter falling over board. A $\frac{3}{4}$ in. anchor is carried on the bow to prevent nosing over when no buoys are available.

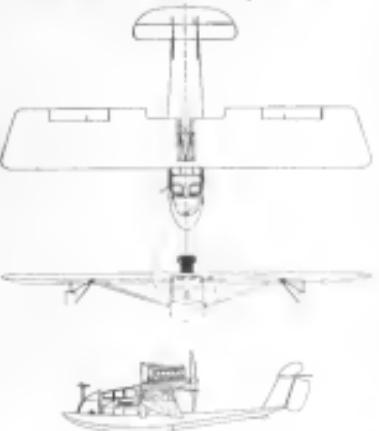
The engine is a 450 hp Liberty, which is a very powerful engine. The propeller is very necessary in flight, for all the machine has to do is look the engine over to it is stood up on his nose, which owing to the depth of the cockpit is not the risky thing it may sound like.

The sides of the cockpit are a $\frac{1}{4}$ in. veneer framework with aluminum covering, which is bolted onto the portons. Two leathered wing struts are provided for the pilot and the passenger sitting abreast with his. On the nose of the fuselage a small staff carries a metal pressure which answers the

purpose of a sliding indicator. It may be said in passing that this indicator is the most frequent and important indicator for *all* aircraft, directly from the famous "string" of the early Wright Model B biplane (1913), which for long years was sufficiently known to all Wright pilots. In the days when no speed indicators, drift and banking indicators, and so forth still remained in the realm of plane dreams, the Wright "string" played a very important role indeed.

The tail unit of the Loening 22 consists of two parallel vertical stabilizers and the other sources of the picture which form the entire drawing of the aircraft, one of which is mounted a one-piece stabilizer and two side fins. A one-piece elevator and two rudders, all non-balanced, are hinged to the stabilizer and vertical fins, respectively.

The horizontal stabilizer is adjustable as to incidence by means of a hand wheel fitted in the cockpit.



OUTLINE DRAWING OF THE LOENING MODEL 22 AIRPLANE

Following are the principal specifications of the Loening Model 22 Flying Yacht:

Span, 45 ft.
Length, overall 39 ft. 6 in.
Chord, 8 ft.
Weight, 1,410 lbs.
Vertical fins, 16 sq. ft.
Area of wings, tail surfaces and wing struts, 330 sq. ft.
Area of ailerons, 37.7 sq. ft.
Area of elevator, 14 sq. ft.
Area of rudder, 13.5 sq. ft.
Area of vertical fins, 7.5 sq. ft.
Engine, 100 h.p. Hispano-Suiza.
Propeller, two-bladed.
Weight, dry 1,300 lbs.
Oil, 100 lbs.
Weight loaded, 1,600 lbs.
Maximum speed, 120 m.p.h. at 1,700 ft. 0 in.
Cruise speed, 100 m.p.h. at 1,700 ft. 0 in.
Flight ceiling, 10 ft. 0 in.
Flight range, 100 m.p.h. at 1,700 ft. 0 in.
Fuel capacity, 60 ft. 0 in.
Passenger capacity, 4.

A Historical Retrospect

The Loening Model 22 Flying Yacht represents the culmination of the efforts Grover C. Loening has, with numerous

interruptions, pursued these last ten years with a view to producing a flying boat that would be suitable for naval purposes. His first experiments along this line of thought date back to the fall of 1913, when he built a machine, curiously similar in general outline to his Model 22. The early Loeninger had Bleriot XI monoplane wings of 20 ft. span and 5 ft. 6 in. chord, a composite wood and canvas position, and a Breguet type cross-braced tail. The engine, a 7-cyl. 50 h.p. Gnome rotary, whose effective horsepower was about 30, was mounted on top of the hull and rotated a pusher propeller through a chain drive and a gear reduction. The engine, when run dry, would be tested in November 1913, at Loening's shop, when short Wright wings were made and the propeller was prepared. Much trouble was experienced from inadequate engine power and also from the hull which did not prove water-tight, so that in February, 1912, the seaplane was rebuilt and lightened by substituting an aluminum hull. The weight dry was thereby reduced to 1,750 lbs. More structural changes were made in the following months at Bleriot's factory, N. Y., but the fundamental principles of the plane, the use of the transmission presented, extended flight. In May, 1912, this machine was exhibited at the New York Auto Show where it elicited considerable interest as the flying boat type was then totally unknown. After the show the machine was underwent some modifications, the chain drive being done away with and the engine being mounted in a raised position for direct drive. But even these changes were unable to overcome the low power and high head resistance of the machine, and these experiments caused it to end shortly afterwards.

The second model was brought out by Mr. Loening in the spring of 1913. This was a biplane with a steel framework sheathed with aluminum, while the wings had steel spar aluminum ribs and fabric covering. The span of the wings was 30 ft. and the total supporting area 200 sq. ft. The power plant consisted of a 6-cyl. vertical 50 h.p. engine built by H. M. Crane, which worked well with a flywheel. The propeller was geared to it like in the previous boat. The dry weight of the machine was 950 lbs.

The first test, in the Hudson River, in which several short flights were made, seemed promising enough, when a thunderstorm surprised the machine at its mooring, at Seabert's Beach, and destroyed it before it could be saved. Mr. Loening shortly afterwards joined the Wright Co. and was instrumental in developing together with Orville Wright the Wright aircraft that appeared in the spring of 1914. In this machine he was largely used, the hull being of aluminum, although the wings were built with Wright power. The engine, a 6-cyl. vertical 60 h.p. Wright, was mounted in the hull and drove two pusher propellers through a chain transmission. This machine had a good performance for its period in which it was built.

Thereafter Mr. Loening's aeronautical activities have been centered upon development, first in connection with the U. S. Army, then with the Bleriotine Aeroplane Co., and finally with his own company, the Loening Aeroplane Engineering Corp., high performance wing structures, of which the last is now exemplified by the Model 22 flying seaplane.



THE LOENING MODEL 22 FLYING YACHT

Naval Bureau of Aeronautics

By Our Washington Correspondent

Here is the text of the order creating the Bureau of Aeronautics, as given out by the Acting Secretary of the Navy—

Establishment of the Bureau of Aeronautics

In accordance with Section 9 of the Act Making Appropriations for the Naval Service for the fiscal year ending June 30, 1932 (Public No. 33—47th Congress), there is hereby established in the Department of the Navy a Bureau of Aeronautics, which shall be charged with matters pertaining to naval aeronautics as may be prescribed by the Secretary of the Navy, and all the duties of said Bureau shall be performed under authority of the Secretary of the Navy and his orders shall be issued as commanding from him, and shall have full force and effect as such.

2. Navy Department General Order No. 16 of 6 January, 1931, is hereby canceled and is superseded by this order.

3. The duties of the Bureau of Aeronautics shall comprise all that relates to designing, building, fitting out, and repairing naval and Marine Corps aircraft, except as hereinafter provided.

4. The Bureau of Aeronautics shall recommend to each branch the nature and power of experimental development and preparation of aeronautic material under their bureaus' cognizance.

5. When designs are to be prepared for a new type of aircraft the Bureau of Aeronautics shall have charge in respect to the General Board similar to those prescribed for the Bureau of Construction and Repair in Article 603, U. S. Navy Regulations 1929, and the regulations will be amended accordingly.

6. The Bureau of Aeronautics shall make special provisions in its organization to enable it to furnish the information and services required by the Bureau of Navigation in connection with that bureau's organization.

7. The functions of the Bureau of Navigation with regard to the aeronautics, warrant, and enlisted personnel, both active and reserve, as duty in connection with aeronautics shall remain as at present, with the following exception:—

(a) The Bureau of Aeronautics shall make recommendations to the Bureau of Navigation for the details of officers for duty in connection with aeronautics and shall make recommendations to that Bureau for the distribution in the various ranks of the selected personnel required for aeronautic activities.

(b) The Bureau of Aeronautics shall make recommendations to the Bureau of Navigation on all matters pertaining to aeronautics training.

8. The functions of Headquarters, U. S. Marine Corps with regard to the aeronautics, warrant, and enlisted personnel of the Marine Corps, both active and reserve, on duty in connection with aeronautics, shall remain as at present with the following exception:—

(a) The Bureau of Aeronautics shall make recommendations to the Major General Commandant, U.S.M.C., for the details of officers for duty in connection with aeronautics, including duty in the Bureau of Aeronautics, and shall make recommendations to that officer for the distribution in the various ranks of the selected personnel required for aeronautic activities.

(b) The Bureau of Aeronautics shall make recommendations to the Major General Commandant, U.S.M.C., on all matters pertaining to aeronautics training.

9. The functions of the Bureau of Supply and Accounts as a central contracting, purchasing, storing, issuing, shipping, and accounting agency, will be performed by the Bureau of Aeronautics in the same manner as they are performed by other bureaus of the Navy Department.

10. The Bureau of Construction and Repair shall have

charge of all aeronautic necessities that are an integral part of the structure of air surface or sub-surface vessel, but their design and installation shall be left to the Bureau of

Aeronautics. Test and Experiment Stations now under the Bureau of Construction and Repair which are equipped to perform other kinds of experimental and test work besides aeronautics work shall remain under their present cognizance, but all aeronautics tests and experiments within the capacity of the Bureau of Aeronautics.

11. The Bureau of Engineering shall have cognizance of all matters relating to the design, manufacture, installation, maintenance, repair, and operation of aircraft radio installations and radio installations installed on surface and sub-surface vessels primarily for aeronautical use, but their design and installation shall be satisfactory to the Bureau of Aeronautics. The Bureau of Engineering shall be responsible for the Bureau of Aeronautics, which are accepted to perform other kinds of experimental and test work besides aeronautics work, shall remain under their present cognizance, but necessary tests and experiments within the capacity of these plants shall be made in accordance with requests of the Bureau of Aeronautics.

12. The Bureau of Ordnance shall have cognizance of all matters pertaining to armament, ordnance, design, and manufacture of aircraft armament, specifications and methods of manufacture shall be determined after consultation with and according to the requirements of the Bureau of Aeronautics. The installation of all ordnance installed in aircraft and all final tests of armament ordnance installed on the air will be made by the Bureau of Ordnance.

The Bureau of Ordnance and the Bureau of Engineering shall have cognizance of the development, construction, maintenance, repair, and modification of armament shops, establishments, but all requirements in connection therewith shall be subject to the approval of the Bureau of Aeronautics. Repairs of public works and public utilities at aeronautics shore establishments within the capacity of the Bureau employed, as well as their upkeep and operation, shall be under the cognizance of the Bureau of Aeronautics.

13. The Bureau of Navigation shall have cognizance of all aeronautics compasses and instruments for aerial navigation, ground instruments used in connection with air navigation and the navigational instruments at Naval air stations, but the design, type, and modification of the material shall be satisfactory to the Bureau of Aeronautics.

14. The Bureau of Navigation shall have cognizance over the policy of the upkeep and operation of the following naval aeronautics equipment:

- (a) Naval Aircraft Factories
- (b) Naval Aeronautics Experimental Stations
- (c) Helium Plants, so far as they come under Naval cognizance.

15. The necessary steps shall be taken promptly by the various bureaus and offices of the Navy Department and Marine Corps, affected by the terms of the order, to turn over to the Bureau of Aeronautics, the Bureau of Navigation, the Childs of that Bureau, the other, cyphers, technical, chemical, and managerial personnel, together with the necessary records, equipment, and facilities now assigned for aeronautics work under their cognizance.

TRANSMISSION
Acting Secretary of the Navy.

A New Aircraft Concern

The American Aircraft, Inc., of Baltimore was recently organized for the purpose of manufacturing, assembling, and distributing standard and custom built aircraft, specializing in the "Cessna" and OX5 motors.

The company also maintains a department of operations underling all the branches of commercial aviation, the department being in charge of experienced pilots.

The aerodrome is situated at Legion Field, Md., five miles northeast of Baltimore. The plant and office are situated at Legion Field.

All the personnel of the organization are among Maryland's pioneers in aviation. The officials of the company are Robert J. Stewart, president and treasurer; George D. Blane, secretary. The directors are F. G. Eversole, E. J. Stover, O. O. Blane, W. H. Campbell, B. Gordon.

Two New Courses in Aeronautics

In cooperation with the division of the Air Service of the United States Government, Roosevelt University at Winona, Ill. C. will start a course on September 19 in Aviation. This will be one of the most thoroughly conducted schools in the country and will help to make of aviation a profession. Leading experts in the Army Air Service, the Navy Air Service, and the Air Mail division of the United States Post Office will be consultants in planning, and administrative, and practical subjects will be taught in accordance with requests of the Bureau of Aeronautics.

Roosevelt University School of Aeronautics will meet all requirements of the government and will obtain the use of airplanes and other means and methods of instruction. Each branch of the Air Service has flying fields, pastures, photographs, and other practical illustrations of modern flying methods in war and commerce.

President Eversole stated recently that the new school will open with instruction in Army Navigation, Army Flying, and Air Mail. Combinations of some of the most expert ground school instructors in aviation during the war will co-operate to teach these classes.

The school of Aviation is in the College of Commerce. Persons who are interested in the school either for correspondence or residence study should write to President Louis W. Stover, 202 Jackson, Chicago, Ill., or to Mr. B. C. Eversole, who is in charge of the school.

It is expected that Detroit will soon become an aeronautics center and that the demand for men trained in aerial science will become greater as time goes on. The University of Detroit is formulating plans for the establishment of a four-year course is necessary.

In the opinion of Capt. Thomas F. Penn, head of the new Department of Aeronautics at the University, who was interviewed on the new courses, there are two ways of getting an education related to aeronautics. One is to get some aeronautics experience, and if spared for future investigation, return to solid earth and shake the theory. The other way is to tackle the theory first and then try it out on the air. To money we see as to the latitude of this course, the subjects to be taught in the aeronautics course are given, as follows:

Higher Mathematics, Computation, Mapping, Astronomy, Physics, Meteorology, Weather Conditions, Theory of Flight, Aerodynamics, Aerodynamics, Aerodynamics, Aerodynamics, Testing, Design, Administration, Chemistry, Electricity, Electrifying Principles, Metal Working, Working Drugs and Construction, Topography, Wireless Telegraphy and Teletypes, Safety Devices, use of Instruments, some Commercial Law, and Aerial Navigation Laws, principles of law as will be applied to the air, and Aerial Photography.

Colorado Aero Meet

Colorado's first Aero meet was held by the Colorado Aero Club July 30, 1930, August 1 and 2 on the Curtiss Hangar Field at Denver. The meet was originally to have been terminated on August 1, but owing to the large number of contestants, the meet was held on both the Saturday and the Sunday. A fourth day was added. The attendance for the entire meet was close to three thousand thousand. There were presented eight cups and \$2500 in cash prizes.

The main object of the most throughout was safety. Starting when performed, mostly prevailed at a safe altitude. The officials of the Colorado Club and the Aerial Navigation & Engineering Co. have in this way done a great deal for the safety of the meet.

The machines participating represented almost every commercial type manufactured in America. A banquet was held at the Brown Palace Hotel on August First, Mr. C. A. Johnson president of the Colorado Aero Club presided. The addresses were made by Jerry Vassanoff, H. S. Stiles, Don Hayes, Captain Underwood, Harry Kneller and Al Landers.

Wright Co. Dividend

The Directors of the Wright Co. have declared an initial dividend of 25 cents a share on the company's stock.

"Who's Who in American Aeronautics"

(Copyright, 1931, by The Standard, N.Y., Co., Inc.)

Every week, AVIATION AND AIRCRAFT JOURNAL prints the biographical sketch of men who are prominent in American aeronautics. These sketches will be published later in pamphlet form. As many of the officers change their aeronautic offices, it is believed that a semi-annual issue will be necessary. In compilations of this character many errors and inconsistencies occur. It will be appreciated if corrections are sent to "Who's Who" Editor.

Clayton Bissell

BISSELL, CLAYTON, Inc. Limit., Air Service Division, U.S. Army, 2000, 20th and Thomas Street, Washington, D. C. 20001. Son of John B. Bissell and Anna May Bissell. Educated at Vassar College and Princeton University. Now lives in a house of about three acres of land in the country. Vice-president of the American Aviation Association. Major. Was present at the first meeting of the association and is now president of the group. Major. Military Attorney, Army. 1912-1918. Virginia Pilot, March 1921. Major. 1921. Virginia Pilot, March 1921. Major. 1921. Presently engaged in private pilot for fun and a half score. Present Commander in Chief, Air Service, Inc. 1921. Major. 1921.

Fred Sidney Barnes

BARNES, FRED SIDNEY, Inc. Limit., Air Service Division, U.S. Army, 2000, 20th and Thomas Street, Washington, D. C. 20001. Son of Mr. F. D. Barnes and Mrs. A. D. Barnes. Educated at the University of Texas and the University of Texas. Major. 1921. Presently engaged in the construction of a new aircraft center and that the demand for men trained in aerial science will become greater as time goes on. The University of Detroit is formulating plans for the establishment of a four-year course is necessary.

President Eversole, Edgington, Aug. 4, 1931.

14. U.S.D.C.U. retired General, Army, Aug. 1921. Presently engaged in the construction of a new aircraft center and that the demand for men trained in aerial science will become greater as time goes on. The University of Detroit is formulating plans for the establishment of a four-year course is necessary.

Flight Rating: Army Air Pilot. Present Commander in Chief, Air Service, Inc. 1921. Major. 1921.

Daniel R. Goodech

GOODECH, DANIEL R., Inc. Limit., Air Service Division, U.S. Army, 2000, 20th and Thomas Street, Washington, D. C. 20001. Son of John D. Goodech and Mary E. Goodech. Educated at Princeton University. Major. 1921. Presently engaged in the construction of a new aircraft center and that the demand for men trained in aerial science will become greater as time goes on. The University of Detroit is formulating plans for the establishment of a four-year course is necessary.

Flight Rating: Army Air Pilot. Present Commander in Chief, Air Service, Inc. 1921. Major. 1921.

Jesse A. Woodrell

WOODRELL, JESSE A., Inc. Limit., Air Service Division, U.S. Army, 2000, 20th and Thomas Street, Washington, D. C. 20001. Son of Charles A. Woodrell and Louise (Wright) Woodrell. Educated at West Virginia High School, 1920. Major. 1921. Presently engaged in the construction of a new aircraft center and that the demand for men trained in aerial science will become greater as time goes on. The University of Detroit is formulating plans for the establishment of a four-year course is necessary.

Flight Rating: Army Air Pilot. Present Commander in Chief, Air Service, Inc. 1921. Major. 1921.

Jesse Lee Ellis

ELLIS, JESSE LEE, Inc. Limit., Air Service Division, U.S. Army, 2000, 20th and Thomas Street, Washington, D. C. 20001. Son of Mr. and Mrs. Lee Ellis. Educated at the University of Texas and the University of Texas. Major. 1921. Presently engaged in the construction of a new aircraft center and that the demand for men trained in aerial science will become greater as time goes on. The University of Detroit is formulating plans for the establishment of a four-year course is necessary.

Flight Rating: Army Air Pilot. Present Commander in Chief, Air Service, Inc. 1921. Major. 1921.

Jasper Kasper McMillin

MCMILLIN, JASPER KASPER, Inc. Limit., Air Service Division, U.S. Army, 2000, 20th and Thomas Street, Washington, D. C. 20001. Son of Jasper Kasper and Anna (Frost) McMillin. Educated at Illinois Central College, Mattoon, Illinois. Major. 1921. Presently engaged in the construction of a new aircraft center and that the demand for men trained in aerial science will become greater as time goes on. The University of Detroit is formulating plans for the establishment of a four-year course is necessary.

Flight Rating: Army Air Pilot. Present Commander in Chief, Air Service, Inc. 1921. Major. 1921.

John Raymond Drennan

DRENNA, JOHN RAYMOND, Inc. Limit., Air Service Division, U.S. Army, 2000, 20th and Thomas Street, Washington, D. C. 20001. Son of John M. Drennan and Anna May Drennan. Educated at the University of Texas and the University of Texas. Major. 1921. Presently engaged in the construction of a new aircraft center and that the demand for men trained in aerial science will become greater as time goes on. The University of Detroit is formulating plans for the establishment of a four-year course is necessary.

Flight Rating: Army Air Pilot. Present Commander in Chief, Air Service, Inc. 1921. Major. 1921.

Lloyd L. Harvey

HARVEY, LLOYD L., Inc. Limit., Air Service Division, U.S. Army, 2000, 20th and Thomas Street, Washington, D. C. 20001. Son of John L. Harvey and Anna May Harvey. Educated at the University of Texas and the University of Texas. Major. 1921. Presently engaged in the construction of a new aircraft center and that the demand for men trained in aerial science will become greater as time goes on. The University of Detroit is formulating plans for the establishment of a four-year course is necessary.

Flight Rating: Army Air Pilot. Present Commander in Chief, Air Service, Inc. 1921. Major. 1921.

Edgar A. Liebhäuser

LIEBHÄUSER, EDGAR A., Inc. Limit., Air Service Division, U.S. Army, 2000, 20th and Thomas Street, Washington, D. C. 20001. Son of Edgar A. Liebhäuser and Anna May Liebhäuser. Educated at the University of Texas and the University of Texas. Major. 1921. Presently engaged in the construction of a new aircraft center and that the demand for men trained in aerial science will become greater as time goes on. The University of Detroit is formulating plans for the establishment of a four-year course is necessary.

Flight Rating: Army Air Pilot. Present Commander in Chief, Air Service, Inc. 1921. Major. 1921.

James Alexander Melton

MELTON, JAMES ALEXANDER, Inc. Limit., Air Service Division, U.S. Army, 2000, 20th and Thomas Street, Washington, D. C. 20001. Son of James Douglas Melton and Mary Melton. Educated at the University of Texas and the University of Texas. Major. 1921. Presently engaged in the construction of a new aircraft center and that the demand for men trained in aerial science will become greater as time goes on. The University of Detroit is formulating plans for the establishment of a four-year course is necessary.

Flight Rating: Army Air Pilot. Present Commander in Chief, Air Service, Inc. 1921. Major. 1921.

Budroad Hoppin

HOPPIN, BUDROAD, Inc. Limit., Air Service Division, U.S. Army, 2000, 20th and Thomas Street, Washington, D. C. 20001. Son of Budroad Hoppin and Anna May Hoppin. Educated at the University of Texas and the University of Texas. Major. 1921. Presently engaged in the construction of a new aircraft center and that the demand for men trained in aerial science will become greater as time goes on. The University of Detroit is formulating plans for the establishment of a four-year course is necessary.

Flight Rating: Army Air Pilot. Present Commander in Chief, Air Service, Inc. 1921. Major. 1921.

Thomas W. Blackburn, Jr.

BLACKBURN, THOMAS W., JR., Inc. Limit., Air Service Division, U.S. Army, 2000, 20th and Thomas Street, Washington, D. C. 20001. Son of Thomas W. Blackburn, Jr. and Anna May Blackburn. Educated at the University of Texas and the University of Texas. Major. 1921. Presently engaged in the construction of a new aircraft center and that the demand for men trained in aerial science will become greater as time goes on. The University of Detroit is formulating plans for the establishment of a four-year course is necessary.

Flight Rating: Army Air Pilot. Present Commander in Chief, Air Service, Inc. 1921. Major. 1921.

Bombs or Torpedoes

The following characters of the relative value of bonds and debentures as used in an attack on security have been ascertained and is published to stimulate thought on this all important question. As yet little information is available as to the public's reaction to the use of debentures as issued from security companies. The results of the following tests have been received from the public as to the effect of bonds on security. The outcome of these tests will be published on preference to bonds should be satisfactorily settled.—ECONOMIST.

The history of assessment and arrest shows either one or the other of the opposing parties constantly to be advancing to their goal pace with our superiors in the naval. At a narrow narrow assessment, the protection covering of the target under fire would be at the most a poor plate of the capital ship or the auxiliary, or concrete of the shore battery, it matters little. Similarly, in a narrow assessment measure the ordinances which are to be passed

The present was but resulted in a broader conception of the meaning of those terms, however. Thus any factor contributing to the defense, exclusive of personnel, is armor, and similarly any factor contributing to the attack, exclusive of personnel is armament. As an illustration, consider the following form both of armor or armament depending upon the manner in which it is used.

Aircraft have increased great relevance because this has one aspect of power and armament. In previous wars, with the exception of shore battery work, different branches of opposing forces seldom came into conflict. That is to say that naval forces were exclusively engaged with naval forces, army forces with army forces, and air forces with air forces. The organization being an already mentioned, shore battery work. The design of aircraft has changed by opening up previously closed channels of attack and defense. Thus we have already

caused changes in strength and weight, and containing substances, such as iron, and nuclear weapons through. The recent war showed aircraft able to knock out buildings both the other landmarks of the service, so that as these factors these services will not only have to prepare a defense against their own kind of an opposing force, but also from the dominating factor of the opposing force—the aircraft.

The Army has defined defense as attacking a battle group. As soon as a scheme of attack is evolved a scheme of defense will be advanced to meet it. The logical procedure will be to plan an attack for which a defense cannot easily be evolved. Any particular form of aerial attack is open to destruction. Information available indicates that bombing is safe. Whether this is because it is the best method of attack or because it is the method of attack best adapted by

The most valuable part of the modern capital ship is the material and equipment available to a captain. The most valuable part of the modern capital ship is below the water line—not so much from a standpoint of tonnage as from the standpoint of losing part out of action by an explosion which will damage apparatus controlling rudder, steering apparatus, and the many mechanisms which combine to enable a capital ship to perform its duty.

The fire control gear also will be liable to disengagement by the explosion of an aircraft projectile which would not, in this particular case, need to make the step to put it out of action.

For attacking a capital ship the torpedo might be preferable to the bomb. The outstanding advantage of the torpedo passes over the bombing attack is that its chances of success are half those of the bombing method. A bomb must be sighted against error longitudinally and laterally while a torpedo need only be sighted against the former error.

Consider the menu: bombing tests. The longitudinal axis was for the most part correct. The glances were due to errors in lateral axis. This is the error which would be eliminated when sighting a torpedo. Furthermore, bombing involves

the maximum chance of error should be done later, down to the wind, preferably the latter, to eliminate drift. The simplest defense then for a ship under attack from bombs would be to go across wind. Drift caused by cross winds relative to the target gives the chance of hitting the target when the ship is moving across the wind. The attack should be carried out by high speed, folding wing torpedo and plane carrying planes which will leave their short or carrier base, as the maximum response, covered by fighters machine.

All the attackers will be in constant radio communication with their commanders who will direct the attack on the superior of the battle formation. The attackers will approach the target zone from the left with the main force, the right wing will be used as a diversion and the whole formation covered by a lightning maneuver. The torpedoes will be launched from the nose of a smoke screen previously established by those of the escort division. The smoke screen will be broken by the front of attack and the torpedoes will be met by a smoke screen from the destroyer escort of the capital ships. In this event the smoke-ships will detach themselves from the formation, and with their escort a smoke screen will be maintained and the water on the deck of the fleet will be protected by the heavy smoke screen. The attacking fighting machines will be engaged with those of the enemy.

Consideration must be given, in this time of battle, as a very form, to those important elements of attack—surprise and morale. In both these the attacking aircraft will have clear bases. They will see before they are seen, and when the attack is under way, if things come to the worst, we can have faith in our men, knowing that once Josephine will reach these marks even if it is necessary for the pilots to fly recklessly in the face of even fire.

"Santa Mima" Arrives at Chicago

"Santa Maria," the twelve passenger flying boat of the Aeromarine Engineering & Sales Co., completed another leg of its long voyage from Havana, Cuba, when it arrived at Chicago July 28, having left Detroit six days previously. The machine was piloted by Edward Marsh and the passenger was Lt. Commander P. N. L. Ballocher, Commander of the U. S. Naval Air Station at Key West, Fla.

Police Inspector of Detroit, A. W. Mitten, President Detroit Automobile Club, Jack Burns of the New York Tribune and C. T. Holden, Sales Manager of the Automobile Co. Numerous other passengers were carried from town in large and small boats. Stops were made at Bay City, Boston Harbor, Harbor Beach, Mackinaw, Traverse City, Charlevoix, Manistee, Muskegon, City, Muskegon, Sheboygan and Milwaukee. An enthusiastic reception was given the sun voyagers at all stops.

Assessors' Co. of Taxation Co.

Traverse City, Michigan, will be the distributing point for territory north of Grand Rapids for the *Automobile Aviator* Co. M. D. Reed will represent the magazine in the western

Underwriters' Aircraft Certificate

On the opposite page there are reproduced the regulations which the Underwriters' Laboratories, under a recent decision, issue to aircraft and aircraft pilots concerning certain requirements. These requirements, which were published on July 18, 1921, issue of AVIATION AND AIRCRAFT JOURNAL, are based on the provisions of the International Convention for the Regulation of Air Navigation and correspond to the

adopted for Lloyd's Aviation Register.

In connection with the Underwriters' Laboratories plan for registering aircraft and aircraft parts the reader is also referred to the conditions governing the admittance of American Aircraft to Canada, which was published in the *TRANSPORTATION AND AVIATION JOURNAL* above mentioned.



Air Seasoning Wood

In view of the use of wood in the aircraft industry it is interesting to learn that in cooperation with the sawmills and wood utilization plants throughout the country, the Forest Products Laboratory, Madison, Wisconsin, is conducting an extensive study of the use of wood in aircraft construction. This study, it is believed, will be of extreme interest to the lumber manufacturers and to the wood-using industries. The purpose is to determine the piping practice which will result in the fastest drying rates, consistent with the least depreciation of stock, the least amount of required yard space, and the least handling costs. The study will be carried on concurrently on both hardwoods and softwoods. All the experiments concern woods of the United States will eventually receive consideration.

The results of some of these experiments on old growth timber, for example, have been made known to mark the exact conditions under which drying time and drying costs can be reduced to a minimum. It is not actually known which of the



PACIFIC SWALLOW MODEL C1 FLYING BOAT FOR LEISURE OR BUSINESS

numerous methods of piping will give the quickest and the cheapest results under given climatic conditions. The new program will furnish a comparison of the effects of such piping variables as length, diameter, and the number of turns in layers, the location of pipe foundations, and the direction of piping with relation to prevailing winds and yard airways.

The study is expected to decide whether from a business standpoint lumber should be dried partly at the mill and partly at the point of utilization, or whether it should be completely dried at the mill. The data collected will also aid in showing whether air seasoning or kiln drying is the more preferable

New Air Transport Company

The Eastern Airlines, Inc., has been incorporated in Maryland. The headquarters of the company will be in Baltimore from which they intend to undertake passenger carrying, aerial survey and photography.

The president and manager of the concern is Ewing Ester, and the secretary and treasurer is Robert Strong. Other incorporators include C. E. Reynolds, E. McNeil Shannahan, George Orr, and Elliott Wheeler.

Air Service Designations

Pending the revision of Army Regulations an order issued by the Secretary of War and signed by General Pershing, Chief of Staff, states that the designation "cavreg" as used in regulations applying to troops of Cavalry and battalions of Field Artillery, applies also to squadrons, air corps, communications sections and photo sections of the Air Service. The designation "cavreg", as used in the regulations, applies also to groups of the Air Service.

Forest Fire Patrols

Borrowing of War Weeks has announced that the use of Army airplanes for fire patrol in western forests will be discontinued next summer because of the large reductions now being made in appropriations permitting expenditures for only the most necessary military needs.

CALIFORNIA

SAN FRANCISCO, CALIFORNIA

EARL P. COOPER AIRPLANE & MOTOR CO.

ILLINOIS

CHECKERBOARD AIRPLANE SERVICE
FOREST PARK, ILLINOIS

INDIANA

One of the largest and best equipped flying fields
in the United States.
CURTISS-INDIANA COMPANY
Manufacturers
ALL TYPES OF CURTISS PLANES

LOUISIANA

GULF STATES AIRCRAFT COMPANY
SHREVEPORT, LA.

MASSACHUSETTS

BOSTON AND SPRINGFIELD, MASS.
EASTERN AIRCRAFT CORP.
100 FIRST ST., BOSTON, MASS.

MINNESOTA

WHITE BEAR LAKE, MINN.
The Total Cost of a new
Harold G. Peterson Aircraft Company
SCHOOL OF AVIATION

NEW YORK

AEROMARINE AIRWAYS, INC.
Passenger and Mail Carrying, 5 passengers, open
31 Passengers First Class - 5 passengers, open
and enclosed Flying Boats - Sightseeing Flights - Flights to Shore
and Lake Resorts

NEW YORK & NEW JERSEY

CURTIS FIELD, GARDEN CITY, LONG ISLAND
KELNHOWER FIELD, BUFFALO, N. Y.
FLYING STATION, ATLANTIC CITY, N. J.
CURTISS AEROPLANE & MOTOR CORPORATION

OHIO

DAYTON, OHIO.
Belpointe, Hangar, Shop and Field 5 miles from Dayton Radio.
JOHNSON AIRPLANE & SUPPLY CO

OREGON

LAND OR WATER FLYING
OREGON, WASHINGTON AND IDAHO AIRPLANE COMPANY
PORTLAND, OREGON

PENNSYLVANIA

Pitts School and Commercial Aerobatics
Official Flying and Aerobatic School of Pennsylvania
PHILADELPHIA AERO-SERVICE CORPORATION
45th Real Estate Trust Building, Philadelphia.

WISCONSIN

CURTIS-WISCONSIN AIRPLANE CO.
FLYING SCHOOL
Milwaukee Air Park
GEORGE E. WIEDEMAYER
Milwaukee, Wis.

See Classified Section

If you are not one of the subscribers to *AVIATION* and having first class rates for passenger, cargo, photographic, and special flights, you should be represented in *WHERE TO FLY* next week.

26 Consecutive Insertions \$20.00



The Laird Swallow

American First Commercial Airplane

THE Laird "Swallow" has claimed large measure of fame because of the advanced design, which makes possible great performance with comparatively low horsepower. Please send report that Laird "Swallow" which is the first such plane now made.

The descriptive Laird "Swallow" booklet contains the interesting history of the development of the Laird principle of design. Write or send the coupon for your copy.

E. M. LAIRD COMPANY

MANUFACTURERS
WICHITA, KANSAS
General Sales Office
2216 SO. MICHIGAN AVE., CHICAGO.

E. M. Laird Company,
2216 So. Michigan Ave., Chicago, Ill.
Please send the descriptive booklet on the Laird "Swallow".
Name _____



THE EARLY BIRD (HD-1)

OUR AIRPLANES ARE PRODUCED BY MEN EXPERIENCED IN THE DESIGN AND CONSTRUCTION OF COMMERCIAL AND WAR TIME AIRCRAFT OF ALL TYPES

Type	Weight Pounds	Length Feet	Width Feet	Number of Motors and H.P.	Max. Speed M.P.H.	Alt. Feet	Flight Time Hours	Flight Time Hours	Flight Time Hours
HD-1B	2800	35	10	12 cyl. 300 H.P.	8-100	10,000	0.5	1000	1000
HD-4B	3840	37 or 38	12	18 cyl. 300 H.P.	12-150	18,000	0.5	1400	1400

HUFF, DALAND & CO., INC.
OGDENSBURG, NEW YORK

AIRPLANES FLYING BOATS

MOTOR BOATS

REASONS WHY YOU SHOULD JOIN THE

Washington, D. C.
Mills BuildingNew York City
11 East 38th Street

Aero Club of America

THE AERO CLUB OF AMERICA is the one authoritative body representing national and international aeronautical affairs.

The purposes of the Aero Club of America are directed to the advancement of all phases of aeronautics, including military and naval activities relating to national defense, the development of commercial aviation, the air mail service, the enactment of federal legislation governing aerial navigation, and the industrial and technical progress of the art and science of aeronautics.

As a non-partisan and constructive force for the national good, its influence is being extended to every state, every county, and every local community, and organization makes membership possible to all those everywhere, who are interested in aviation.

Through affiliation with the Federation Aeronautique Internationale, direct contact exists with the aeronautic activities of all other countries of the world.

Members are kept in touch with world progress in aircraft, and the best organized thought of the country upon aeronautical issues will be transmitted to the legislative branches of state and federal governments.

That our country may acquire and maintain leadership in this newest and fastest means of transportation, so intimately interwoven with all future plans for our national security and defense, is the desire of every American. You can render direct aid and support to this important end, by putting the weight of your influence into the work, through membership in the Aero Club of America.

Application for Aero Club of America Membership

To Membership Committee of the

AERO CLUB OF AMERICA

I desire to signify my interest in Aviation by applying for membership in the Aero Club of America, and I agree to abide by its rules and requirements.

Remittance is enclosed to cover dues for one year Non-Resident \$10.00
 Resident \$8.00
 Tax 3.00 \$35.00

Date

Signature

Membership No.

Address

Forward with remittance to Aero Club of America, (National Headquarters)
11 E. 38th Street, New York, N.Y.

BUY IT FROM
THE NAVY



BOEING SEA-PLANE

The Boeing Sea-Plane is a tractor biplane, equipped with a Hall-Scott 800-horsepower engine. It is a two-float type with two places and dual controlwheels. The draft when fully loaded is fourteen inches. The wing spread is about 44 feet and the supporting surface, including ailerons, is 495 square feet. The weight light, including instruments and water, is 1,940 pounds and the total weight at 2,450 pounds, which gives 5 pounds per square foot and 34.6 pounds per horsepower.

The maximum and landing speeds are 73 and 46 miles per hour respectively, the climb is 2,500 feet in ten minutes and the endurance is 2.2 hours.

The Boeing Sea-Plane is manufactured by the Boeing Airplane Company, Seattle, Wash.

The planes are located at the Naval Air Station, San Diego, Calif.

They are new and unused and have not been removed from the original packing crates. Cost (approximately) \$10,300.00. Sale price \$1,500.00. Handling trucks for Boeing Planes \$ 100.00.

Curtiss "K" and "KX" Curtiss "V" 200
HP. Hispano-Suiza 140 HP. U.S.A. 12 Liberty
Hall-Scott A7A Hall-Scott A7A. Wisconsin
Renault, Gnome, Fiat.

Radialon, Tachometers, Altimeters,
Thermometers, Aero Watch, Clocks,
Compasses, Barographs, Cameras,
Propellers, Gnome, Fiat.

Write for Illustrated and Descriptive Catalog Today

CENTRAL SALES OFFICE 176 Navy Yard
Bureau of Supplies and Accounts
NAVY DEPARTMENT, WASHINGTON, D.C.

FOR SALE**CANADIAN CURTISS - OX-5 MOTOR**

Completely rebuilt, motor overhauled, wings recovered, repainted, etc. This work performed in our own shop. Machine like new in every way.

**DAYTON WRIGHT CO.,
DAYTON, OHIO.**

The Spark Plug That Cleans Itself

B. G.

Contractors to the U. S. Army Air Service & the U. S. Navy

**THE B. G. CORPORATION
33 GOLD STREET
NEW YORK CITY**

U. S. A.

CANUCK

AND
OX5 ENGINE SPARE PARTS
IMMEDIATE DELIVERY
C.A.L. PROPS. \$15 PARAGON PROPS. \$30
HOME - TURNET RADIATORS \$20
ALSO COMPLETE ASSORTMENT OF STANDARD UTILITY PARTS
"GET OUR PRICES BEFORE ORDERING"
AIRCRAFT MATERIALS & EQUIP. CORP.
1400 SEDGWICK AVE. NEW YORK CITY

THE AVIGLAS with NOVIOL lenses.

This Goggle was standardized by the United States Army for the use of its Aviators during the World War. Special price - each \$6.00.

**F. A. HARDY & COMPANY
10 South Wabash Avenue
Chicago, Illinois**

**CONNECTICUT SPEED
FLYING SCHOOL ANSWERS.**

LEARN TO FLY!

IN CHICAGO WITH
THE RALPH C. DIGGINS CO.

YESTERDAY, flying the day after you get in. Complete in
knowledge, technique, aerodynamics, aerobatics, flying
and flying in formation. You can learn to fly
PILOTS LICENSE \$2000 Per Year and Up
REGD. TRADES

THE RALPH C. DIGGINS CO.
Dept. 285, 140 N. Paulina Street Chicago, Ill.

Warwick NON-TEAR Aero-Cloth**A SAFE CLOTH for FLYING**

For Particulars Apply to
WELLINGTON SEARS & CO.
51 Worth Street, New York

DISTINCTIVE

**Business Cards, Letter Heads
Announcements**

ENGRAVED AND ENBOSSED EFFECTS

NON-PLATE ENGRAVING CO.
114 W. 56th STREET NEW YORK CITY
PHONE CIRCLE 8275

O X 5**SPECIAL COMBINATION OFFER:**

8 New Pistons	list price \$15.00	OUR PRICE
10 New Carb. Bungs	list price \$2.00	FOR EXPORT
8 New Carb. Valves	list price \$12.00	COMPLETE
9 New Exhaust Valves	list price \$20.00	
2 Long Threaded Bolts		
Long Threaded Bolts	list price \$1.00 and 2/16"	\$10.00
		340.00

Other combinations offered and all materials, instruments and
parts for \$25 and Cansons at equally attractive prices - write
promptly for complete price list. Quick service and
most important material guaranteed.

JAMES LEVY AIRCRAFT CO.
301 INDIANA AVENUE CHICAGO, ILL.

INDEX TO ADVERTISERS**A**

Aero Club of America	282
Aero Import Corp.	287
Aeronautic Plane & Motor Co.	282
Aircraft Materials & Equipment Corp.	284
Aircraft Service Directory	288

B

B. G. Corporation, The	284
------------------------	-----

C

Castrol Aeroplane & Motor Corp.	295
---------------------------------	-----

D

Dayton Wright Co.	284 & 286
-------------------	-----------

Diamond State Fibre Co.	285
-------------------------	-----

Duggins, Ralph C., Co., The	284
-----------------------------	-----

H

Hardy, F. A.	284
--------------	-----

Hoff, Delco & Co., Inc.	281
-------------------------	-----

L

Ladd, E. M., Co.	281
------------------	-----

Lerry, James, Aircraft Co.	284
----------------------------	-----

M

Martin, The Glenn L., Co.	288
---------------------------	-----

N

Serry Department	283
------------------	-----

Sei-Plate Engineering Co., The	284
--------------------------------	-----

S

Sperry, Lawrence, Aircraft Co., Inc.	286
--------------------------------------	-----

T

Tessier-Morse Aircraft Corp.	285
------------------------------	-----

W

Wellington, Sears & Co.	284
-------------------------	-----

Where in Flight	285
-----------------	-----

Wright Aeronautical Corp.	283
---------------------------	-----

Diamond

Fibre
the universal Raw Material

Carbons and Graphite materials exceed all unprepared
metals, wood, leather, paraffin, glass and many
other materials and materials. But there are many
things that are not prepared by any other company
and more efficiently than Diamond Fibre. To buy
Diamond Fibre is truly representing when you
purchase with decided advantages in cost, better
quality and results.

This truly remarkable material is stronger and
more durable than wood or metal and lighter
at weight than aluminum. It has an enormous
tensile strength, is adaptable to every machine
process - easy to heat and formed. Takes an
attractive finish and is practically indestructible.

We produce Diamond Fibre in standard sheets, rods
and tubes, or we can supply you with special forms
machined to your specifications.

Dept. 48

Diamond State Fibre Company

Bridgeport (near Philadelphia) Penna.
Branch Factory and Warehouse, Chicago.

Office in principal cities
In Canada, Diamond State Fibre Co. of Canada, Ltd., Toronto

Sopwith Camels

An ideal plane for the experienced pilot
to get about with.

High Speed 110 M.P.H.
Landing Speed 38 M.P.H.
Fuel Capacity 4½ hours

We have a few slightly used camels at
attractive prices.

**The Lawrence Sperry
Aircraft Company, Inc.**

Long Island, N. Y.

Phone: Farmingdale 122

No Blocks

GLENN L. MARTIN Airplanes have one outstanding advantage that neither automobiles nor locomotives can ever have.

Every method of land transport is strictly limited by the condition of the road bed. Cloud burst, wash-out, or fallen bridge will hold up mail, express, or fast freight for hours, and sometimes for days.

These delays are paid for in time stolen from production, increased overhead, and lost earning capacity.

The airplane sails aloft unhampered. Its road is the shortest distance between two points. Its speed, the greatest which man has ever achieved.

If your business has imperative needs for speed in transportation, discuss your problem with us.



TRADE-MARK

THE GLENN L. MARTIN CO.
CLEVELAND

Member of the Manufacturers Aircraft Association



TRADE-MARK